

**AMENDMENTS TO THE SPECIFICATION:**

Please amend the specification as follows:

Please amend the paragraph on page 1 beginning with "The slot" as follows:

The slot array antenna and plasma processing apparatus according to the present invention is generally applicable to general plasma processing procedures, including the production of materials for electronic devices such as semiconductors or semiconductor devices, and liquid crystal devices. For the convenience of explanation, however, only the background art relating to liquid crystal devices will be described here.

Please amend the paragraph on page 1 beginning with "In general" as follows:

In general, ~~[[in]]~~ the ~~processes~~ process for manufacturing liquid crystal devices~~[[,]]~~ involves subjecting a base material (such as wafer) ~~for a liquid crystal device as an object to be processed is subjected~~ to various kinds of treatments such as CVD (chemical vapor deposition), etching, and sputtering. A plasma Plasma processing apparatus ~~[[have]]~~ has often been used for conducting such treatments. This is because, when a plasma processing apparatus is used, a substrate can be processed ~~[[while]]~~ if the substrate is maintained at a low temperature.

Please amend the paragraph on page 1 beginning with "The above-mentioned" as follows:

The above-mentioned JP-A No. 2000-123997 (Patent Document 1) discloses a plasma processing apparatus, which ~~is usable~~ may be used for manufacturing liquid

crystal devices. ~~On the other hand, in~~ In such a plasma processing apparatus ~~to be~~  
~~used for manufacturing liquid crystal devices,~~ use of a slot array antenna is considered  
to be very promising ~~[[as a]]~~ and highly efficient antenna having a small transmission  
loss. ~~Among these, particularly~~ Particularly promising ~~[[one]]~~ is an apparatus having a  
single layer structure (wherein a power feeding waveguide is disposed in the same  
plane as a radiating waveguide) capable of permitting easy formation of an antenna  
structure ~~therefor~~, wherein power is supplied to the radiating waveguide via a window  
provided in the wall of the power feeding waveguide.

Please amend the paragraph on page 2 beginning with "However, according" as  
follows:

However, according to the present inventors' experiments, it has been found that,  
when ~~[[the]]~~ using a conventional plasma processing apparatus having the above-  
mentioned structure, it is difficult to increase the plasma density in the plasma  
processing chamber.

Please amend the paragraph on page 2 beginning with "An object" as follows:

~~An object of the~~ The present invention ~~is to provide~~ provides an antenna and a  
plasma processing apparatus, which ~~overcome~~ overcomes the above-mentioned  
problem encountered in the prior art.

Please amend the paragraph on page 2 beginning with "Another object" as follows:

~~Another object of the~~ The present invention is to provide also provides an antenna and a plasma processing apparatus, which can easily increase the plasma density in a plasma- processing chamber.

Please amend the paragraph on page 2 beginning with "As a result of earnest" as follows:

~~As a result of earnest study, the~~ The present inventors have found that the conventional close or dense arrangement of slots in a radiating waveguide (i.e., at intervals which are sufficiently smaller than the wavelength of microwave) in order to obtain an exponential attenuation of electromagnetic field, may provide a disadvantage, especially when a material having a relatively large dielectric constant (e.g., one having a dielectric constant of 4 or more) is used in the radiating waveguide. The present inventors have further found it extremely effective in attaining the above object to constitute a radiating waveguide such that the slot interval "d" in the radiating waveguide is substantially the same as the wavelength  $\lambda_m$  of above-mentioned microwave in the radiating waveguide.

Please delete the paragraph on page 2 beginning with "As a result of further."

Please amend the paragraph on page 3 beginning with "The plasma" as follows:

[[The]] A plasma processing apparatus consistent with ~~according to~~ the present invention ~~is based on the above discovery, and~~ comprises~~[[:]]~~ a power feeding waveguide for feeding microwave power. The plasma processing apparatus further comprises a plurality of rectangular radiating waveguides connected to a plurality of windows which are disposed along the longitudinal direction of the power feeding waveguide. The plurality of windows are disposed so as to guide the microwave power from the plurality of windows to the outside of the antenna. Each of the radiating waveguides has a plurality of slots disposed along the longitudinal direction of the radiating waveguide. The interval "d" between the centers of gravity of slot pairs or slots is substantially the same as the wavelength  $\lambda_m$  of the microwave in the rectangular radiating waveguide.

Please delete the paragraph on page 3 beginning with "a power."

Please delete the paragraph on page 3 beginning with "a plurality."

Please delete the paragraph on page 3 beginning with "wherein each."

Please amend the paragraph on page 3 beginning with "The present" as follows:

The present invention ~~may also provides~~ provide a plasma processing apparatus comprising~~[[:]]~~ a plasma processing chamber for subjecting an object to a plasma treatment. The present invention may also provide an antenna for guiding microwave

power into the plasma processing chamber so as to generate plasma in the plasma processing chamber. The antenna comprises a power feeding waveguide for feeding microwave power and a plurality of rectangular radiating waveguides connected to a plurality of windows. The plurality of windows are disposed along the longitudinal direction of the power feeding waveguide, so as to guide the microwave power from the plurality of windows to the outside of the antenna. Each of the radiating waveguides has a plurality of slots disposed along the longitudinal direction of the radiating waveguide. The interval "d" between the centers of gravity of slot pairs or slots is substantially the same as the wavelength  $\lambda_m$  of the microwave in the rectangular radiating waveguide.

Please delete the paragraph on page 3 beginning with "a plasma."

Please delete the paragraph on page 3 beginning with "antenna."

Please delete the paragraph on page 3 beginning with "wherein."

Please amend the paragraph on page 4 beginning with "Fig. 6" as follows:

Fig. 6 is a graph schematically showing (a) the shape of a standing wave provided by an antenna member according to the present invention, (b) the position of ~~[[slits]]~~ slots corresponding to the shape of the standing wave, and (c) the plasma intensity corresponding to the shape of the standing wave.

Please delete the paragraph on page 5 beginning with "In the."

Please amend the paragraph on page 5 beginning with "The slot" as follows:

The slot array antenna according to the present invention comprises: a ~~power-~~  
~~feeding~~ power-feeding waveguide for feeding microwave power; and a plurality of  
radiating waveguides connected to a plurality of windows which are disposed along the  
longitudinal direction of the ~~power-feeding~~ power-feeding waveguide so as to guide the  
microwave power from the plurality of windows to a plasma processing chamber. The  
plurality of radiating waveguides are generally disposed so that their longitudinal  
directions are substantially perpendicular to the longitudinal direction of the ~~power-~~  
~~feeding~~ power-feeding waveguide. The present invention is characterized in that each  
of the above-mentioned radiating waveguide waveguides has a plurality of slots  
arranged along the longitudinal direction of the radiating waveguide, and the interval "d"  
between the plurality of slots is substantially the same as the wavelength  $\lambda_m$  of the  
above-mentioned microwave.

Please amend the paragraph on page 6 beginning with "On the" as follows:

As mentioned previously however, ~~On the contrary, as in the prior,~~ when ~~[[the]]~~  
slots are arranged closely or densely (i.e., at intervals which are sufficiently smaller than  
the wavelength of microwave) in a radiating waveguide in order to obtain an exponential  
attenuation of electromagnetic field, such a structure may provide a disadvantage,  
especially when a material having a relatively large dielectric constant is used in the  
radiating waveguide.

Please amend the paragraph on page 6 beginning with "Referring" as follows:

Referring to Fig. 1, ~~the an~~ antenna 1 in this embodiment comprises a ~~power-~~  
~~feeding~~ power-feeding waveguide 2 for feeding microwave power, and a plurality of  
radiating ~~waveguide~~ waveguides 3 having a height "b". These radiating waveguides 3  
are connected to a plurality of windows 4 which are disposed along the longitudinal  
direction of the ~~power-feeding~~ power-feeding waveguide 2 so as to guide the microwave  
power from the plurality of windows 4 to the outside of ~~[[the]]~~ antenna 1 (e.g., into an  
~~unshown~~ unseen plasma processing chamber).

Please amend the paragraph on page 6 beginning with "Each" as follows:

Each of the radiating waveguides 3 has a plurality of slots 5 disposed along the  
longitudinal direction of the radiating ~~waveguide~~ waveguides 3, and the interval "d"  
between the plurality of slots 5 is set to a value which is substantially the same as the  
wavelength  $\lambda_m$  of the above-mentioned microwave. In Fig. 1, although each of the  
plurality of the slot slots 5 has the shape of "X", ~~[[but]]~~ the shape of ~~[[the]]~~ each slot is  
not particularly limited as described hereinbelow.

Please amend the paragraph on page 7 beginning with "In the present invention,  
the interval" as follows:

In the present invention, the interval "d" between the plurality of slots 5 is  
substantially the same as the wavelength  $\lambda_m$  of the above-mentioned microwave. More  
specifically, the ratio of the interval "d" between the plurality of slots 5 to the wavelength

$\lambda_m$  of the above-mentioned microwave, ( $d/\lambda_m$ ), may preferably be in the range of 0.75 - 1.25, or more preferably in the range of 0.9 - 1.1.

Please amend the paragraph on page 7 beginning with "In the present invention wherein" as follows:

In the present invention wherein such a structure of slots is adopted, even if a material having a relatively large dielectric constant is used in the inside of antenna means, it becomes easy to substantially suppress the attenuation of the electromagnetic field in the plasma processing chamber so that the plasma density in the plasma processing chamber may easily be maintained at a high level. According to the present inventors' investigation, ~~that the reason for the easy~~ maintenance of the plasma density at a high level may presumably be a phenomenon ~~[[that]]~~ caused by the attenuation characteristic of the radiated electromagnetic field ~~[[is]]~~ not being represented by an exponential function, but by  $(1/Z)$  (wherein  $Z$  is the distance from the antenna in the direction perpendicular to the antenna).

Please amend the paragraph on page 7 beginning with "Further" as follows:

Further referring to Fig. 1, side wall members 6 (in this Figure, in the form of plate-like members) ~~[[6]]~~ are disposed at the respective positions corresponding to the windows 4 along the longitudinal direction of the ~~power-feeding~~ power-feeding waveguide 2. When the side wall members 6 are located in this manner, it is possible to obtain an advantage that the impedance matching in the ~~power-feeding~~ power-feeding feeding waveguide can be achieved so as to improve the transmission efficiency.



Please amend the paragraph on page 8 beginning with "Further" as follows:

Further, in Fig. 1, there is adopted a ~~power-feeding~~ power-feeding system (sometimes, also referred to as " $\pi$ -branching") in which a cut-out portion 7 is provided in each wall 6 between two radiating waveguides 3 so as to feed the microwave power to the two radiating waveguides 3 from a single window 4 (with respect to the details of " $\pi$ -branching", for example, a paper written by Takahashi, Hirokawa, Ando, and Goto may be referred to). When such a ~~power-feeding~~ power-feeding system is adopted, it becomes easy to feed the microwave power to the respective radiating waveguides 3 in an "in-phase" manner.

Please amend the paragraph on page 8 beginning with "Referring" as follows:

Referring to Fig. 2, a sidewall member 6 is disposed at the position of the wall of the ~~power-feeding~~ power-feeding waveguide 2, which is disposed opposite to the window 4 provided in the wall of the ~~power-feeding~~ power-feeding waveguide 2. Two radiating waveguides 3 are disposed at the position corresponding to the window 4 such that the longitudinal direction of ~~[[these]]~~ the radiating waveguide waveguides 3 is substantially perpendicular to the longitudinal direction of the ~~power-feeding~~ power-feeding waveguide 2. In the ~~neighborhood~~ vicinity of the connecting portion (matching element), between the radiating waveguide 3 and the ~~power-feeding~~ power-feeding waveguide 2 at the terminal end of the ~~power-feeding~~ power-feeding circuit, a short-circuiting member 8 is provided ~~for the purpose of short circuit~~ as shown in Fig. 2. Therefore, it is extremely preferred to design the connecting portion between the ~~power-~~

~~feeding~~ power-feeding waveguide 2 and the radiating waveguide 3 in such a terminal end in consideration of a higher mode with respect to the window 4 and the short-circuiting member 8.

Please amend the paragraph on page 9 beginning with "As shown" as follows:

As shown in Fig. 2, the ~~power-feeding~~ power-feeding waveguide 2, two radiating waveguides 3, and the side wall member 6 are ~~in electromagnetic coupling~~ electromagnetically coupled to each other via the window 4 provided in the ~~power-feeding~~ power-feeding waveguide 2 and the cut-out portion 7. The width of the ~~power-feeding~~ power-feeding waveguide 2 is denoted by "a", the width of the radiating waveguide 3 is denoted by "c", and the height of these ~~waveguide~~ waveguides is denoted by "b" (illustrated in Fig. 1). The width of the coupling window 4 is denoted by "w", and the center of the window 4 is shifted from the center of the cut-out portion 7 by  $[[\text{"d"}]]$  "e". The thickness of the common wall 10 interposed between the two radiating waveguides 3 is denoted by "g", and the distance of the wall 10 from the window 4 is denoted by "h". The side wall member 6 is located at the position corresponding to  $x = p$  and  $[[y]] \leq q$  in the xyz-coordinate system as shown in Fig. 2 where the origin is represented by O, and the thickness thereof is denoted by "r". The wall thickness of the ~~power-feeding~~ power-feeding waveguide 2 and the radiating waveguide 3 is denoted by "t". The structure shown in Fig. 2 is uniform in the y-direction.

Please amend the paragraph on page 9 beginning with "In" as follows:

In the structure as shown in Fig. 2, a preferred structure ~~or constitution~~ is as follows:

Please amend the paragraph on page 9 beginning with "The width" as follows:

The width  $w$  is monotonically increased along the longitudinal direction of the ~~power-feeding~~ power-feeding waveguide 2 from the ~~power-feeding~~ power-feeding side toward the distal end. The mode of this increase may more preferably be monotone.

Please amend the paragraph on page 9 beginning with "The position" as follows:

The position  $h$  is monotonically increased along the longitudinal direction of the power feeding waveguide 2 from the ~~power-feeding~~ power-feeding side toward the distal end. The mode of this increase may more preferably be monotone.

Please amend the paragraph on page 9 beginning with "Basically" as follows:

Basically, the value of the  $x$ -coordinate  $p$  is also changed monotonically, but at the distal end, it becomes a specific value depending upon the combination structure so as to provide  $[[a]]$  good impedance matching.

Please amend the paragraph on page 10 beginning with "(4)" as follows:

(4)  ~~$x$ -coordinate~~  $z$ -coordinate  $q$  of the sidewall member 6:

Please amend the paragraph on page 10 beginning with "Basically" as follows:

Basically, the value of the x-coordinate z-coordinate q is also changed monotonically, but at the distal end, it becomes a specific value depending upon the combination structure so as to provide a good impedance matching.

Please amend the paragraph on page 10 beginning with "Preferred" as follows:

Preferred examples of the values of the above-mentioned various parameters are as follows in Table 1:

Center frequency of the microwave

	<u>11.85 GHz</u>	<u>2.45 GHz</u>
<u>Parameter</u>		
<u>Width "a" of power-feeding waveguide 2</u>	<u>17.3 mm</u>	<u>83.7 mm</u> <u>(80-110 mm)</u>
<u>Width "c" of radiating waveguide 3</u>	<u>16.5 mm</u>	<u>79.9 mm</u> <u>(75-100 mm)</u>
<u>Wall thickness "t", "g" of waveguide</u>	<u>2.0 mm</u>	<u>2.0mm</u>
<u>Height "b" of waveguide</u>	<u>4.0 mm</u>	<u>15. mm</u> <u>(10-40 mm)</u>
<u>Shift "e" of window</u>	<u>0.0 mm</u>	<u>0.0 mm</u>
<u>Thickness "r" of Sidewall member</u>	<u>2.0 mm</u>	<u>2.0 mm</u>

~~Center frequency of the microwave: 11.85 GHz 2.45 GHz~~

~~Width "a" of power feeding waveguide: 17.3mm 83.7mm (80 - 110 mm)~~

~~Width c of radiating waveguide: 16.5 mm 79.9 mm (75 - 100 mm)~~

~~Wall thickness t, g of waveguide: 2.0 mm 2.0 mm~~

~~Height b of waveguide: 4.0 mm 15 mm (10 - 40 mm)~~

~~Shift d of window: 0.0 mm 0.0 mm~~

~~Thickness r of sidewall member: 2.0 mm 2.0 mm~~

Please amend the paragraph on page 10 beginning with "For" as follows:

For the purpose of comparison, a conventional slot array antenna is schematically shown in Fig. 3. Referring to Fig. 3, the slots constituting a radiating waveguide 3 are constructed such that the width  $[[L]]$  thereof satisfies a relationship of  $L_1 < L_2 < \dots < L_n$ ,  $l_1 < l_2 < \dots < l_n$ , as shown in Fig. 3(a), and the interval between these slots is smaller than  $[[1/2\lambda]]$   $(1/2)\lambda$  (where  $\lambda$  is the wavelength of the microwave in the waveguide), as shown in Fig. 3(b). In such a conventional slot array antenna, the microwave power is radiated from the radiating waveguide 3 to the outside of the antenna such that the strength of the electromagnetic field is exponentially attenuated.

Please amend the paragraph on page 11 beginning with "(One" as follows:

(One embodiment of a plasma processing apparatus)

Please amend the paragraph on page 11 beginning with "Fig. 4" as follows:

Fig. 4 is a schematic sectional view showing the plasma processing apparatus according to a preferred embodiment of the present invention. Referring now to Fig. 4, in a plasma-processing chamber  $[[10]]$  15 constructed as a closed container, there is provided a processing stage 12 for placing an object 11 to be processed such as a glass substrate. On the ceiling portion of the plasma-processing chamber  $[[10]]$  15, a microwave inlet window 13 formed of a dielectric material such as quartz and ceramic is disposed. Further, a gas supplying port 14 is provided in the plasma-processing

chamber ~~[[10]]~~ 15 for supplying a reactant gas into the plasma-processing chamber ~~[[10]]~~ 15.

Please amend the paragraph on page 11 beginning with "On" as follows:

On the top portion of the plasma processing chamber ~~[[10]]~~ 15 ~~having such a structure~~, a slot array antenna member 1 having the above-described structure is disposed such that the microwave is fed from the radiating waveguide 3 constituting the antenna member 1 into the plasma processing chamber ~~[[10]]~~ 15 so as to generate plasma in a plasma generating region ~~[[P]]~~ 16 in the plasma processing chamber ~~[[10]]~~ 15, to thereby ~~subject process~~ the object 11 ~~using to be processed~~ to a predetermined plasma treatment.

Please amend the paragraph on page 11 beginning with "(Power" as follows:

~~(Power-feeding~~ Power-feeding waveguide)

Please amend the paragraph on page 11 beginning with "The shape" as follows:

The shape, size, structure, etc., of the ~~power-feeding~~ power-feeding waveguide 2 are not particularly limited, but the ~~power-feeding~~ power-feeding waveguide 2 may preferably be a rectangular waveguide. This is because, in an embodiment using such a rectangular waveguide, it is quite easy to reduce the cost by using a single microwave power supply.

Please amend the paragraph on page 12 beginning with "Material for" as follows:

Material for the ~~power-feeding~~ power-feeding waveguide 2, the radiating waveguide 3 and other members constituting the above-described antenna ~~[[means]]~~ are not particularly limited, as long as microwave power can be supplied by using such antenna ~~[[mean]]~~. In view of the reduction in the loss due to wall current and of the thermal conductivity, however, the material for these members may preferably be one comprising a copper base material with a silver plating.

Please amend the paragraph on page 12 beginning with "(Dielectric" as follows:

(Dielectric material for the radiating waveguide 3 )

Please amend the paragraph on page 12 beginning with "(Variable" as follows:

(Variable ~~[[slit]]~~ coupling window )

Please amend the paragraph on page 12 beginning with "In the" as follows:

In the connecting portion (i.e., ~~power-feeding~~ power-feeding portion) between the ~~power-feeding~~ power-feeding waveguide 2 and the radiating waveguide 3 shown in Fig. 2, a ~~[[slit]]~~ coupling window having a variable width w may be provided, as desired. In an embodiment wherein such a variable ~~[[slit]]~~ coupling window is provided, it is possible to obtain an advantage that the distribution of the radiated electromagnetic field in the chamber can be adjusted and hence the distribution of the generated plasma can also be adjusted.

Please amend the paragraph on page 12 beginning with "In addition" as follows:

In addition, it is also possible that a "rod-shaped" member can be erected in the power-feeding portion of the radiating waveguide 3 so as to adjust the L component, to thereby achieve ~~[[a]]~~ good load matching. In an embodiment wherein ~~[[with]]~~ such a rod-shaped member is provided, the side wall plate 6 in the ~~power-feeding~~ power-feeding waveguide 2 becomes omissible so that the related structure can be advantageously simplified thereby.

Please amend the paragraph on page 13 beginning with "In the embodiment" as follows:

In the embodiment shown in Fig. 1, the slots in the radiating waveguide 3 are in the shape of an "X", but the shape of the matching slot used herein is not particularly limited, as long as the traveling or progressive wave can be substantially erased (i.e., the reflected wave can be substantially eliminated).

Please amend the paragraph on page 13 beginning with "In other words" as follows:

In other words, the shape of the slots may be ~~any of~~ of any known shapes. For example, the slots of any shape shown in the schematic plan view of Fig. 5 may be used. Fig. 5 is depicted so that the respective radiating waveguides 3 have slots of different shapes, but this figure is only for the convenience of explanation. In an actual antenna, the respective radiating waveguides 3 constituting the antenna have the same slot shapes.



Please amend the paragraph on page 13 beginning with "In the case of the" as follows:

In the case of the staggered  $\Lambda$ -shape as shown in Fig. 5(b), the slots are disposed in such a manner that they ~~[[are]]~~ gradually ~~deviated~~ deviate from the center axis of the radiating waveguide 3, and the reflected power in the terminal end can easily be suppressed. This is because the reflection of power is gradually suppressed by each of the gradually deviating slots. Even in the embodiment shown in Fig. 5(b), it is preferred to provide a matching slot suitable for a terminal end, at the terminal end.

Please amend the paragraph on page 14 beginning with "When one" as follows:

When ~~one of each~~ an individual slot in each pair is made shorter than the other slot of the ~~[[slot]]~~ pair, the electromagnetic field tends to be radiated more ~~stronger~~ strongly towards the shorter slot. Accordingly, the "oblique propagation" can ~~[[be]]~~ also be achieved by utilizing such ~~[[a]]~~ characteristics.

Please amend the paragraph on page 14 beginning with "When the" as follows:

When the microwave in the radiating waveguide 3 is a standing (or stationary) wave as shown in Fig. 6(a), the slots corresponding thereto are those as shown in Fig. 6(b). Accordingly, in this case, the plasma intensity directly under the slots is necessarily non-uniform along the longitudinal direction of the radiating waveguide 3, as shown in Fig. 6(c). Therefore, when a standing wave is to be used, it is necessary to provide a space between the radiating waveguide 3 and a object 11 to be processed so

as to ~~uniformize~~ make uniform the plasma intensity, ~~and the~~ The size of the apparatus also tends to be increased.

Please amend the paragraph on page 14 beginning with "In this" as follows:

In this respect, it is preferred that a traveling wave ~~[[is]]~~ be formed along the longitudinal direction of the radiating waveguide 3. This is because, when a standing wave is formed, as described above, the plasma intensity directly under the slots of the radiating waveguide 3 tends to become non-uniform along the longitudinal direction of the radiating waveguide 3.

Please amend the paragraph on page 15 beginning with "In view" as follows:

In view of the impedance matching, etc., a sidewall member 6 in the form of an "adjusting pin" may be used in place of the ~~"plate"-shaped~~ "plate-shaped" member ~~[[as]]~~ shown in Fig. 2. Such an "adjusting pin" ~~(not shown)~~ may preferably be disposed in the ~~neighborhood~~ vicinity of the tip of the "side wall plate" shown in Fig. 2.

Please amend the paragraph on page 15 beginning with "At the" as follows:

At the terminal end of the radiating waveguide 3, a matching slot for suppressing the reflected power from the terminal end may be provided, as desired. When a matching slot is provided at the terminal end, it is possible to obtain an advantage that the traveling wave can be obtained (the reflected wave can be suppressed) in the waveguide.

Please amend the paragraph on page 16 beginning with "The radiating" as follows:

The radiating waveguide 31 may be provided in one-to-one correspondence with the windows 41 in the ~~power-feeding~~ power-feeding waveguide 21. An example of this embodiment is shown in Fig. 8.

Please amend the paragraph on page 16 beginning with "Referring" as follows:

Referring to Fig. 8, the antenna means in this embodiment comprises a power feeding waveguide 23. for feeding microwave power, and a plurality of radiating waveguides 31 connected to a plurality of windows 41 which are disposed along the longitudinal direction of the power feeding waveguide 21 so as to guide the microwave from the windows 41 into a plasma processing chamber. Each of these radiating ~~waveguide~~ waveguides 31 has a plurality of slots 51 disposed along the longitudinal direction of the radiating waveguide 31. Further, the interval "d" between the plurality of slots is substantially the same as the wavelength  $\lambda_m$  of the microwave. The interval "d" of the plurality of slots may preferably be in the range of  $0.75 \leq \lambda_m \leq 1.25$ ,  $0.75 < d/\lambda_m \leq 1.25$  more preferably in the range of  $0.9 \leq \lambda_m \leq 1.1$ ,  $0.9 < d/\lambda_m < 1.1$ , with respect to the wavelength  $\lambda_m$  of the above-mentioned microwave.

Please amend the paragraph on page 16 beginning with "In the" as follows:

In the present invention, the slots having such a structure is adopted, and therefore, it becomes easy to suppress the attenuation of the electromagnetic field introduced to the plasma processing chamber, even when [[a]] material having a

relatively large dielectric constant is used in the antenna means. ~~[[AS]]~~ As a result, it becomes easy to maintain the plasma density at a high level in the plasma-processing chamber.

Please amend the paragraph on page 17 beginning with "On the" as follows:

On the contrary, in the conventional slot array antenna as shown in Fig. 9, the slots 52 are closely arranged (i.e., at an interval d which is substantially smaller than the wavelength of the microwave) in the radiation waveguide 32, so as to provide an exponential attenuation of the electromagnetic field. Accordingly, especially when a material having a relatively large dielectric constant is used in the radiating waveguide 32, this arrangement of ~~[[the]]~~ slots 52 functions unfavorably. Accordingly, when a slot array antenna of the conventional type as shown in Fig. 9 is used, it is difficult to maintain the plasma density at a high level in the plasma-processing chamber.

Please amend the paragraph on page 17 beginning with "The application" as follows:

The application or use of the antenna or the plasma processing apparatus according to the present invention is not particularly limited. In other words, the antenna or the plasma processing apparatus according to the present invention may be applied to any apparatus utilizing plasma such as, for example, a plasma etching apparatus, plasma CVD apparatus, ~~[[and]]~~ or plasma LCD apparatus.